



INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(51) International Patent Classification ⁶:

G06F 17/50, 17/60

A1

(11) International Publication Number:

WO 95/06294

(43) International Publication Date:

2 March 1995 (02.03.95)

(21) International Application Number: PCT/US94/09716

(22) International Filing Date: 24 August 1994 (24.08.94)

(30) Priority Data:

08/113,205

27 August 1993 (27.08.93)

US

(71)(72) Applicant and Inventor: NORRIS, Jeffrey, A. [US/US];
145 Mansfield Circle, Lexington, SC 29073 (US).(74) Agent: MANN, Michael, A.; Michael A. Mann, P.A., P.O. Box
7908, Columbia, SC 29202 (US).

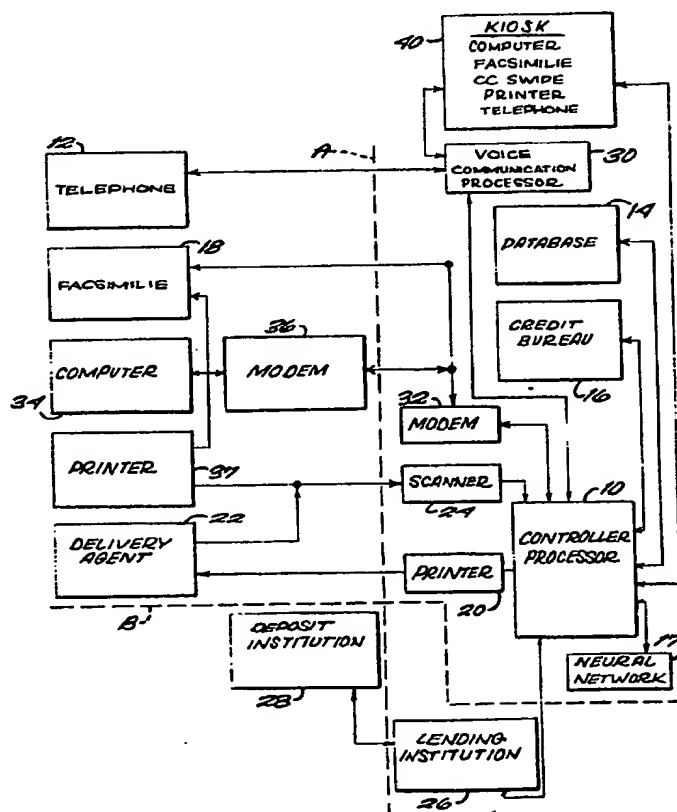
(81) Designated States: AM, AT, AU, BB, BG, BR, BY, CA, CH, CN, CZ, DE, DK, ES, FI, GB, GE, HU, JP, KE, KG, KP, KR, KZ, LK, LT, LU, LV, MD, MG, MN, MW, NL, NO, NZ, PL, PT, RO, RU, SD, SE, SI, SK, TJ, TT, UA, US, UZ, VN, European patent (AT, BE, CH, DE, DK, ES, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, ML, MR, NE, SN, TD, TG), ARIPO patent (KE, MW, SD).

Published*With international search report.**Before the expiration of the time limit for amending the claims and to be republished in the event of the receipt of amendments.*

(54) Title: CLOSED LOOP FINANCIAL TRANSACTION METHOD AND APPARATUS

(57) Abstract

A method and apparatus for closed loop, automatic processing a loan, including completion of the application, underwriting, and transferring funds, includes use of a programmed computer (34) to interface with an applicant, obtain the information needed to process the loan, determine whether to approve the loan, and effect electronic fund transfers to the applicant's deposit account and arrange for automatic withdrawals to repay the loan. Information is received from the applicant preferably by using voice recognition technology (30) but alternatively by entering the alpha-numeric information using a personal computer (34) keyboard or using buttons on a telephone (12). The loan approval determination is made using a neural network (17) with input obtained in part from the applicant and in part from databases (14) accessed by the computer (34), such as a credit bureau (16), to obtain a credit report. The loan agreement is transmitted by facsimile to and from the applicant when the applicant has access to a facsimile machine (18) of data field to be printed (37) or to an agent (22) who delivers the agreement to the applicant when the applicant does not have access. In a preferred embodiment, the applicant accesses the computer (34) from a kiosk (40) where the complete transaction can take place as the applicant waits.



FOR THE PURPOSES OF INFORMATION ONLY

Codes used to identify States party to the PCT on the front pages of pamphlets publishing international applications under the PCT.

AT	Austria	GB	United Kingdom	MR	Mauritania
AU	Australia	GE	Georgia	MW	Malawi
BB	Barbados	GN	Guinea	NE	Niger
BE	Belgium	GR	Greece	NL	Netherlands
BF	Burkina Faso	HU	Hungary	NO	Norway
BG	Bulgaria	IE	Ireland	NZ	New Zealand
BJ	Benin	IT	Italy	PL	Poland
BR	Brazil	JP	Japan	PT	Portugal
BY	Belarus	KE	Kenya	RO	Romania
CA	Canada	KG	Kyrgyzstan	RU	Russian Federation
CF	Central African Republic	KP	Democratic People's Republic of Korea	SD	Sudan
CG	Congo	KR	Republic of Korea	SE	Sweden
CH	Switzerland	KZ	Kazakhstan	SI	Slovenia
CI	Côte d'Ivoire	LI	Liechtenstein	SK	Slovakia
CM	Cameroon	LK	Sri Lanka	SN	Senegal
CN	China	LU	Luxembourg	TD	Chad
CS	Czechoslovakia	LV	Latvia	TG	Togo
CZ	Czech Republic	MC	Monaco	TJ	Tajikistan
DE	Germany	MD	Republic of Moldova	TT	Trinidad and Tobago
DK	Denmark	MG	Madagascar	UA	Ukraine
ES	Spain	ML	Mali	US	United States of America
FI	Finland	MN	Mongolia	UZ	Uzbekistan
FR	France			VN	Viet Nam
GA	Gabon				

CLOSED LOOP FINANCIAL TRANSACTION METHOD AND APPARATUS

5

BACKGROUND OF THE INVENTION

1. Field of the Invention

10 The present invention relates generally to closed loop financial transactions. More specifically, the present invention is a method and apparatus for processing loans automatically, beginning with the loan application and continuing through to transfer of funds to the borrower and to arranging for repayment.

2. Discussion of Background

15 Borrowed money is essential to facilitate commerce and personal finance. Individuals and businesses borrow money on both a short term and a long term basis for better management of their day-to-day financial transactions and to obtain the goods and services they need when they need them. If the need to borrow money is anticipated, the arrangements
20 for borrowing can be made in advance of the need. But financial needs are sometimes not foreseen, and the extent of a financial need is not always known or knowable in advance. Furthermore, these arrangements are usually somewhat of a necessary inconvenience because they take time and effort to complete.

25 When an individual needs to borrow money, the lender will not only expect repayment but will also want to have confidence that the amount lent can be repaid on time. The effort by the borrower to provide

the lender with this confidence level will depend on the amount lent. For example, a loan of less than one hundred dollars might be made simply on the basis of knowing that the individual to whom the money is lent has a job. For lending millions of dollars, the lender may want to take a
5 security interest in assets that have a value in excess of the amount lent to cover fluctuations in the values of those assets during the time the loan is being repaid.

Not only will the borrower have an obligation to convince the lender that the borrower is creditworthy, the lender also has obligations to
10 the borrower. For example, in consumer loans, laws require the lender to carefully explain certain aspects of the terms of the loan.

When time and foresight permit advance arrangement of loans, the act of borrowing can be made much simpler. When time is short and the need for the loan was not anticipated, the act of going through the process
15 of borrowing may be so time-consuming that obtaining the loan may not be possible at all.

Typically, a business and an individual will either borrow relatively small amounts using credit cards, with pre-approved credit limits, or go to a lending institution for larger sums, where the process of completing
20 documentation for borrowing money takes longer and is subject to conditions that must be fulfilled before the loan can be made. Naturally, for large loans, the safeguards for the lender take time. But for smaller loans, those above credit-card limits but still below a level where there might be a significant concern of the ability of the lender to repay the
25 loan, there exists a need for greater convenience.

SUMMARY OF THE INVENTION

According to its major aspects and briefly stated, the present invention is a method and apparatus for closed loop processing of a loan application, including completion of the application, underwriting, and transferring of funds. The term "closed loop" means that all the steps involved in loan processing, including the steps of transferring the funds to the borrower and arranging for repayment as well as completing the loan application and underwriting it, can be done without human intervention. The apparatus uses a computer capability and a communications link, plus other electronic communications equipment, to enable the complete, automated processing of the application, namely, (1) the exchange of information with the applicant preferably using human voice recognition equipment, (2) the underwriting, meaning the evaluation and approval, of the loan, plus (3) initiating electronic transfer of funds from a source of funds to the deposit account designated by the applicant and (4) automatic withdrawals from the applicant's account to repay the loan.

The loan is initiated by an applicant via a variety of communication and electronic routes to make contact with the computer, which responds to the applicant and obtains information using voice communication processing. Information about the applicant is also obtained via electronic transfer of data to the computer from one or more databases, including those that provide name and address based on a caller's telephone number, and from credit bureaus that provide credit reports on an applicant given a name, a social security number and an address. In a preferred embodiment, the computer capability of the present invention

also contains a "neural network" that is used to score the application, that is, to make a determination of whether to approve the loan based on a computer analysis of factors deemed important in assessing the would-be borrower's ability and willingness to repay the loan and to score the loan
5 and assess the risk of it not being paid.

Finally, the loan agreement and related documentation are sent to the borrower by the fastest and most convenient means, including facsimile, direct transmission of electronic datafile to the borrower's personal computer via modem, overnight mail delivery service, and so
10 on. The processing of the loan is done completely and automatically, with human intervention occurring only when the borrower is using a rotary dial telephone, makes too many entry mistakes, wants operator assistance, or the system suspects fraud.

The computer capability of the present invention includes voice
15 communication processing, control processing including analysis and accessing information. These capabilities may be in separate computers or in a single, dedicated computer, perhaps with all capabilities built into a single microchip.

The user may access the system simply by telephone or in one or
20 more other ways. For example, in a preferred embodiment, the user interface is a kiosk housing a communication facility with a monitor and keypad (and perhaps a telephone), a facsimile machine for transmitting documentation from a remote or internal computer to the applicant once the transaction is complete, a bank card reader to identify an applicant,
25 the applicant's bank and associated checking account routing information, and means for electronically transferring the signature of the borrower onto the loan agreement. The kiosk may be established at a convenient

location, such as an airport terminal, a bank; a shopping area or a store selling goods that might carry a price higher than a typical credit card limit, such as a jewelry store or computer sales store, for example.

In an alternate embodiment of user interface, the loan process can be initiated with by agent, such as an insurance agent or financial planner. An agent may have a personal, "lap top" computer with a modem and facsimile machine for use in assisting the borrower in applying for a loan. An advantage of these channels for accessing the loan system of the present invention is the fact that insurance agents and financial planners are accustomed to handling important financial documentation.

An important feature of the present invention is the extent to which the loan is processed by computer. Computers are used to assist in processing loans routinely, but the extent of use here significantly exceeds that known in the art. Here, the processing by computer includes underwriting the loan application and deciding to make or deny the loan (or delay loan approval until more information is provided). The use of the computer to access certain information not within its own memory also eliminates the need for human-based processing. Avoiding human intervention not only saves processing time and reduces errors, but also eliminates bias in the decision to approve or deny the loan.

The use of a kiosk to make available to borrowers the communications capability for applying for a loan is another important feature of the present invention. Kiosks, placed in convenient locations, will contain electronic equipment that facilitates and speeds all of the steps in obtaining a loan. Importantly, because funds are deposited directly into the borrower's bank account rather than dispersed directly to

the borrower from an automatic teller machine, the obtaining of funds from such a kiosk is safer than obtaining funds from a teller machine.

Another feature of the present invention related to the processing of the loan is the use of neural networks by a computer to make the decision that the borrower is likely repay the loan. Neural networks mimic the decision-making process of a human and, given the increase in loan processing productivity, are cost-effective. Neural networks in the preferred embodiment of the present invention make the lending decision, but in an alternative embodiment, are used to adjust periodically a more traditional scoring system.

Still another feature is the combination of automatic processing of a loan with direct deposit of funds and automatic withdrawal for repayment. These features enable the loan to be made on the same day in most cases, but at least by the next business day, and to give the lender some measure of control over repayment by facilitating automatic withdrawal thereby eliminating both delays in mailing payment checks and forgetfulness on the part of the borrower in making timely payments to the lender.

Other features and advantages will be apparent to those skilled in the art of automatic financial transactions from a careful reading of the Detailed Description of Preferred Embodiments accompanied by the Drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

In the drawings,

Fig. 1 is a flow chart depicting the major steps of an automatic
5 financial lending system according to a preferred embodiment of the
present invention;

Fig. 2 is a perspective view of a kiosk according to a preferred
embodiment of the present invention; and

Fig. 3 is a front view of a portion of the kiosk of Fig. 2 according to
10 a preferred embodiment of the present invention.

DETAILED DESCRIPTION OF PREFERRED EMBODIMENTS

The present invention is a method and apparatus for making loans
15 automatically, that is, a closed loop loan. By the term "automatically," it
is meant that the application is received and processed, the decision made
to grant or deny the loan, and the deposit of the loaned amount to the
borrower's account is made entirely by computers in conjunction with
voice and electronic communication equipment.

20 Fig. 1 shows a schematic diagram according to a preferred
embodiment of the present invention. Everything to the left of line A of
Fig. 1 represents the equipment used by the loan applicant; everything
above line B relates to the present invention; everything below line B is
used with the present invention but is not part of the inventive
25 combination. An important feature of the present invention is its
flexibility in enabling the borrower to gain access to a system
controller/processor 10 via a voice communication processor 30, and in a

number of other different ways, in order to apply for the loan. Several of these ways will be described below, but for the present purposes, it will be assumed that the borrower is accessing communication processor 30 using a telephone 12 rather than using any more elaborate, electronic

5 communications hardware over a communications link. A communications link is at least one telephone line, perhaps one or more dedicated line, in the kiosk embodiment to be described presently. Voice communication processor 30 is the interface between telephone 12 and controller/processor 10, enabling the controller /processor 10 to "talk" to
10 the borrower over telephone 12, and in a preferred embodiment to be described presently, for the borrower to input responses to controller/processor 10 by speaking to communication processor 30.

It will also be assumed that the borrower is accessing communication processor 30 without assistance from either an employee
15 of the lender or its agent, but these alternative embodiments will also be described below.

In its simplest embodiment and briefly stated, the process begins when the borrower calls communication processor 30 using telephone 12. Controller 10 obtains information in part from the calling borrower, via
20 communications processor 30, and in part from a database 14 using the borrower's telephone number for identification. Controller 10 determines caller's name and address from database 14 based on the telephone number of the caller. Other than confirmation that the caller wants to apply for a loan, the amount desired, and the term, controller 10 initially
25 needs only the loan applicant's name, address and social security number for identification. This information is used to obtain a credit report from a credit bureau 16.

The borrower's credit report is obtained from credit bureau 16 by controller 10, evaluated by a neural network 17, to be described more fully below, and a decision is made by neural network 17 in the form of a score and an associated risk factor to grant or deny the loan.

- 5 Communication processor 30 informs the borrower of the decision and, if the loan is granted, arranges to get documentation that contains the terms of the loan to the borrower for signing.

- The documentation can be sent both to and from the applicant completely or partway by facsimile 18 to reduce the transaction time. An
10 agreement received by the applicant by facsimile 18 can be signed and returned by facsimile 18. Facsimile capability is not required, however. For example, if the caller has a personal computer 34, a modem 36 and a printer 37, then an electronic file of the documents can be transmitted to the caller, printed out on the caller's printer 37, signed and mailed back,
15 or sent by facsimile if available. Alternatively, the loan agreement documents can be sent by facsimile to a nearby delivery agent 22 that can deliver them to the caller who can sign them, and then delivery agent 22 can send them back by facsimile. In this example, the execution of these documents can easily be effected the same day. Delivery agent 22 can be
20 the U.S. Postal Service, a private delivery service, or an agent providing this service to the lending institution, such as an insurance agent or financial planner.

- The executed documentation can also be received by controller/processor 10 in several ways, such as by an electronic file sent
25 via modem 32, as a facsimile transmission that can be received directly into controller/processor 10, or as paper documents, sent by overnight mail, to be scanned into controller 10 with a scanner 24. If the documents
- on

are complete and signed, controller 10 arranges for electronic transfer of funds from a lending institution 26 directly to the borrower's account in a deposit institution 28 and, via communications processor 30, contacts the borrower to confirm the time and date of the transfer. The caller will
5 repay the loan in installments automatically withdrawn from the deposit account by lending institution 26 or other institutions to which the loan might be assigned.

In the foregoing embodiment, communication processor 30 requires the following information from the caller: verification that the
10 caller is calling about a loan, the loan amount, the term of the loan, verification of the caller's name and address and home/business telephone number, and the caller's social security number. This information is forwarded to controller 10 which then obtains other information from data base 14, including name and address corresponding to the telephone
15 number of the caller. Finally, with the caller's name, address and social security number, controller 10 can obtain a credit report from credit bureau 16.

Communications processor 30 receives information from the caller over the communications link by instructing the caller to push buttons on
20 telephone 12. Alternatively and preferably, processor 30 has a voice recognition processing capability for receiving and interpreting words spoken by the caller to the extent needed to process the loan. Communications processor 30 is programmed to speak with a synthesized or pre-recorded voice.

25 Communications processor 30 will obtain the telephone number of the caller using automatic number identification technology from the local telephone company or by asking the caller to input the number using

the buttons on a "touch tone" telephone. The caller's telephone number is forwarded to controller 10. Controller 10 then uses this information to access database 14 for additional information regarding the caller. Data base 14 is one of several, currently available, commercial data bases to
5 determine the address and name of a caller. These data bases are offered by Polk, R. R. Donnelley & Sons, MetroNet, and Telident, and can be accessed for use on a subscriber's system. Alternatively, and preferably, voice recognition using a voice communication processor 30 can be used to obtain the alphabet-based information, namely, address and name of
10 the caller, directly from the caller and numerical information when the caller presses the touch tone telephone buttons in response to requests for the numerical information.

After confirming the caller's name and address from data base 14, and including perhaps a simple inquiry for verification of the name,
15 number and address plus a request for the caller's zip code, communications processor 30 asks the caller/borrower for his social security number. While the credit report is being obtained from credit bureau 16 via controller 10, the amount of the loan and the preferred repayment schedule can be obtained by exchange of information with the
20 caller and communications processor 30. With telephone 12, the caller can indicate yes or no to various questions by pressing the telephone buttons indicated for response by processor 30, or, if processor 30 has voice recognition capability, by simply saying yes or no over telephone 12.

25 When controller 10 has received the credit report, it sends the report via communications link to neural network 17 to begin the evaluation of the loan request. A neural network is the name generally

given to a system designed to evaluate several, potentially-competing factors to arrive at a decision in the form of a score. The evaluation proceeds by iterating among a set of criteria that are weighted. In the present application, one criterion that may be used in deciding to grant
5 the loan is that the applicant have a full time job; this criterion may in fact have the greatest weight. However, if the borrower owns a home and has several bank accounts, criteria directed toward these assets might outweigh the lack of a job.

Analyzing the loan application involves determining a score on
10 which granting or denying the loan will be based. A typical scoring system simply assigns points to various factors that may be considered in the loan determination. Preferably, however, a neural network is used for making the loan determination or at least for updating on a periodic basis the point applied by a more traditional scoring system.

15 Neural network 17 is established by first identifying criteria that might have a bearing on the ability and willingness of the borrower to repay the loan. Then historical data are gathered to determine the influence, or weight, to be given to each criterion. The data are examined and the initial set of weighting factors are applied to develop estimates of
20 the actual outcome of the data. The network's estimates are compared to the actual outcome and the weights are adjusted to make the estimates closer until the outcome predictions have been optimized. Neural network 17 uses information calculated from the credit report, such as the ratio of debt to liquidity. A neural network designer will also make a
25 judgment on how few criteria are needed to make a sufficiently accurate prediction. There are commercially available computer programs, known to those skilled in the art of computer decision-making, that can be used

to develop neural networks for the lending model by simply entering the criteria and initial weighting factors.

If the analysis of neural network 17 determines that the loan should be made, additional information is confirmed by communications processor 30 from data obtained from database 14 or credit bureau 16 or is obtained from the caller using communications processor 30, namely, the caller's deposit account number, the caller's facsimile number, the caller's acceptance of automatic withdrawal. Then, the terms and conditions of the loan must be established in writing and the borrower's signature obtained. Obtaining the signature of the borrower can be accomplished in several ways. If the borrower is being assisted in making the application for a loan by an insurance agent or financial planner with a personal computer and modem, or if the borrower is making the loan application from a kiosk, as will be described below, the signature can be obtained using an inkless "electronic pen" that, when the borrower makes a signature while holding the pen, recreates an image of the signature of the borrower on the signature line of the image of the documents displayed on the personal computer monitor. If the agent or planner has a printer 37, a copy of the executed documents can be printed out for the borrower and the electronic data file of the documents and signature transmitted back to controller/processor 10. In the case where a borrower has initiated the borrowing transaction from a kiosk, the signed documentation is printed out using a facsimile or a laser printer.

If the borrower is making the loan application by telephone, a copy of the documents can be sent to a nearby location by facsimile and delivered to the borrower by a delivery agent 22. Controller/processor 10

can also print out the loan agreement using printer 20 and mail it by overnight mail service to borrower.

The executed agreement, if received in paper form from the borrower, is scanned into controller by scanner 24 for examination of the signature block. If the agreement has been properly executed, the controller will issue an electronic instruction to a source of funds such as lending institution 26 to transfer electronically the loan amount to the borrower's bank account at deposit institution 28. Before the deposit is made, however, there are several checks made to prevent fraud, including verification of signature as well as comparison of information obtained from the borrower with that available from a credit report, such as date of birth and the number of years with a present employer. Part of the terms of the lending agreement include permission from the borrower for the lender to make an automatic, periodic withdrawal from the borrower's bank account for repaying the loan. The automatic direct deposit by electronic fund transfer to and the automatic withdrawal of payment from the borrower's deposit account are especially important features of the present invention because they eliminate portions of the process from human control and delays. Also, if the borrower has an immediate need for the loan, direct deposit will make these funds available as quickly as possible, avoiding delays resulting from mailing, lost checks, the time taken for a check to clear, and the need to go to the deposit institution to make the deposit. Any documentation requiring the borrower's signature, including consumer lending disclosure information, will be handled as discussed previously.

No human needs to intercede in most cases. Communication processor 30 communicates with the borrower and controller 10 extracts

information from data base 14 and credit bureau 16; neural network 17 makes the decision to lend and controller 10 arranges for the lending agreement to be signed. Controller 10 effects the electronic fund transfer and arranges for automatic withdrawal of monthly payments. If the caller
5 requires help while communicating with communications processor 30, pressing # or 0 will result in automated messages or an attendant, respectively, to assist the caller. Pressing * will repeat the previous sequence for the caller. If the caller seems confused, communications processor 30 will interrupt the processes and provide attendant assistance
10 or a telephone number for attendant assistance.

In an alternate embodiment, borrowers can apply for a loan using a personal computer 34 and a modem 36 by contacting controller 10 via telephone 12 through a communications link. Controller 10 will interact using the monitor of computer 34 to prompt the borrower who can type in
15 the information needed and indicate responses to controller 10 for the latter to obtain the credit report and process the loan. The document can be received via modem 36 into computer 34, printed using printer 37. The documentation can be returned to controller 10 by facsimile 18 when the borrower is so equipped.

20 As an example of the prompting that can be done, communications processor 30 can ask: "Are you currently employed? Press 1, if yes; 2, if no.", "How much is your monthly income?", or "How much do you spend per month?" This information, provided by way of example, would be available from a credit report but can be confirmed by
25 prompting a response. Alternatively, if the information is asked and the responses, based on a partial analysis, indicate that the loan cannot be

made, the borrower can be so informed and the time, need and cost of obtaining a credit report can be avoided.

The answers to the prompts can be input by the borrower by pressing buttons on a telephone, keying entries in a personal computer by
5 an insurance agent or financial planner or by the borrower's own personal computer or using the special keypad in a kiosk.

In a related alternative embodiment, an agent of the lender can assist the borrower in applying and can provide the electronic communications equipment. For example, insurance agents and financial
10 planners can assist borrowers in processing loans. Most borrowers are located near an insurance agent's office and such agents frequently visit private homes as a part of their insurance work.

Not every loan decision will be clear. In the event the analysis by neural network 17 is inconclusive, the borrower will be called back by
15 communications processor 30 and asked for an additional business day to qualify the loan application and, if the request is granted, the time for the return call will be arranged.

If the loan can be granted, communications processor 30 (or controller 10 if the borrower is using a personal computer) will confirm
20 the amount that can be loaned, the monthly payment and the term of the loan. The disclosures required under applicable consumer lending laws and other documentation can be signed in ink or, in a kiosk, using an electronic pen and then returned by facsimile, by electronic data file transmission, or by overnight mail.

25 The controller/processor 10 via the communication processor 30 will review with the borrower the information relevant to the loan, such as the account number to which the direct deposit will be made and the

name of the deposit institution, the account number and name of the automatic withdrawal institution, the date of the month and the first month the automatic withdrawal will begin, the address and payee if the check is not intended for deposit into an account, late charges that could apply, the finance charge, the annual percentage rate, the total cost of all the payments, and the total amount financed. This information needed from the borrower regarding his or her accounts can be obtained by communications processor 30 as neural network is making the determination to make the loan, or the borrower can indicate a telephone number where he or she can be reached for a call back after the loan is approved so any additional information can be obtained then.

If the loan is to be secured by collateral, the collateral needs to be identified and its value determined. If the item being purchased can serve as collateral, that fact can be confirmed via communications processor 30 as well as the identity of the goods and their whereabouts and location of title or a bill of sale.

The preferred embodiment for enabling a borrower to make a loan application is in the form of a kiosk. Figs. 2 and 3 depict a kiosk 40 for use by an applicant in initiating a loan. A kiosk is basically a housing that can contain all of the equipment for a borrower to use in contacting and communicating with a remote, centrally located processor 10, or, alternatively, it contains processor 10. Kiosk 40 has a computer 42 with a monitor 44, a keyboard 46, a magnetic bank card reader 48 that enables a bank card to be read to identify an applicant as well as the applicant's bank and corresponding checking account, an internal facsimile with communications link (not shown in Figs. 2 and 3) and, in a preferred embodiment, means for transferring a signature to a document such as

electronic signature block 50 and electronic pen 52. Block 50 is a surface that converts the motion of electronic pen 52 as borrower holds it and goes through the motions of making a signature to an electronic image of a signature and transfers it electronically to computer 42. The image of the signature can also be used by the lending institution to verify the borrower's signature before the direct deposit is made.

An applicant will enter kiosk 40 and indicate using keyboard 46 his interest in a loan. He will be prompted by computer 42 via monitor 44 to run a bank card through bank card reader 48 to identify himself or alternatively may simply enter his name, address and social security number. Computer 42 will forward information to controller 10 via a communications link which will access one or more databases, such as credit bureau 16 to obtain a credit report. As before, the information obtained from the applicant and from the credit report will be scored. Preferably using neural network 17, to determine whether or not to approve the loan. If approved, the applicant will be so informed and the loan information provided. The signature of the applicant can be obtained using block 50 and pen 52, and a signed copy of the agreement printed out for the applicant by a facsimile 54. Meanwhile, the time of the effectiveness of the electronic transfer of funds will have been arranged and communicated to applicant as well as obtaining of his permission to have his deposit account automatically debited to repay the loan.

It will be apparent to those skilled in the art that many modifications and substitutions may be made to the foregoing preferred embodiment without departing from the spirit and scope of the present invention which is defined by the following claims.

WHAT IS CLAIMED IS:

1. A method for processing a monetary loan application from an applicant using a programmed computer and a communications link, said
5 method comprising the steps of:

exchanging information regarding said loan application between said applicant on one end of said communications link and said computer on an opposing end of said communications link;

10 determining by analysis by said computer whether to approve said application based in part on said information;

confirming approval of said loan to said applicant via said communications link;

contacting a source of funds by said computer via said communications link; and

15 initiating by said computer via said communications link an electronic transfer of said loan to an account designated by said applicant from said source of funds.

2. The method as recited in claim 1, further comprising the step of
20 arranging by said computer over said communications link for automatic withdrawal of payments from said account to said source of funds to repay said loan.

3. The method as recited in claim 1, further comprising the step of
25 obtaining a credit report regarding said applicant from a credit bureau based on said information, said credit report requested by said computer over said communications link and received by electronic data transfer to

said computer from said credit bureau, said determining step based on analysis by said computer of said credit report.

4. The method as recited in claim 1, further comprising the step of
5 transmitting to said applicant from said computer over said
communications link an image of a loan agreement.

5. The method as recited in claim 1, wherein said step of
determining is performed by said computer using a neural network for
10 said analysis.

6. The method as recited in claim 1, further comprising the step of
converting information provided orally by said applicant at said first end
of said communications link to electronic signals using means for
15 recognizing human voice, said recognizing means in electronic
communication with said computer.

7. Apparatus for processing an application by an applicant for a
monetary loan, said apparatus for use with a source of funds, said
20 apparatus comprising:

a programmed computer;

a communications link between said source of funds and said
computer;

means for transmitting and receiving an electronic data file of a
25 loan agreement, said transmitting means connected to said computer; and
means for programming said computer to obtain said application
from said applicant, process said application and approve said loan.

8. The apparatus as recited in claim 7, wherein said transmitting and receiving means includes means for electronically transferring a signature of said applicant to said agreement.

5

9. The apparatus as recited in claim 7, wherein said programming means programs said computer to effect, via said communications link, an electronic transfer of funds from said source of funds to a deposit account identified by said applicant.

10

10. The apparatus as recited in claim 7, wherein said communications link is in communication with a credit bureau and said programming means includes means for accessing said credit bureau via said communications link to obtain a credit report about said applicant.

15

11. The apparatus as recited in claim 7, wherein said communications link is in communication with a database and said programming means includes:

means for obtaining from said database via said communications link information about said applicant; and
means for determining whether said application should be granted based on said information.

20

12. The apparatus as recited in claim 7, wherein said communication link is in communication with a database and said programming means includes:

25

means for obtaining, via said communications link, information about said applicant; and

a neural network to analyze said information to determine whether said application should be approved.

5

13. The apparatus as recited in claim 7, further comprising a scanner in electrical communication with said computer for obtaining an image of a document.

10

14. The apparatus as recited in claim 7, wherein said communications link has a first end connected to said computer and an opposing second end, and said apparatus further comprises a kiosk containing said computer, said transmitting and receiving means and said programming means.

15

15. The apparatus as recited in claim 7, further comprising means for reading a bank card to identify said applicant, said reading means in communication with said computer.

20

16. Apparatus for processing an application by an applicant for a monetary loan, said apparatus for use with a source of funds, said apparatus comprising:

a kiosk;

a programmed computer in said kiosk;

25

means in said kiosk for reading a bank card to identify said applicant;

a communications link having a first end and an opposing second end, said first end connected to said computer, said second end in communication with said source of funds;

means in said kiosk for printing a loan agreement, said printing

5 means connected to said computer; and

means for programming said computer to obtain said application, process said application and approve said loan.

10 17. The apparatus as recited in claim 16, wherein said printing means includes means for electronically transferring a signature to said agreement.

15 18. The apparatus as recited in claim 16, wherein said programming means programs said computer to effect, via said communications link, an electronic transfer of funds from said source of funds to a deposit account identified by said applicant.

20 19. The apparatus as recited in claim 16, wherein said communications link is in communication with a credit bureau and said programming means includes means for accessing said credit bureau via said communications link for information about said applicant.

25 20. The apparatus as recited in claim 16, wherein said communications link is in communication with a database and said programming means includes:

means for obtaining from said database via said communications link information about said applicant; and

means for determining whether said application should be granted
based on said information.

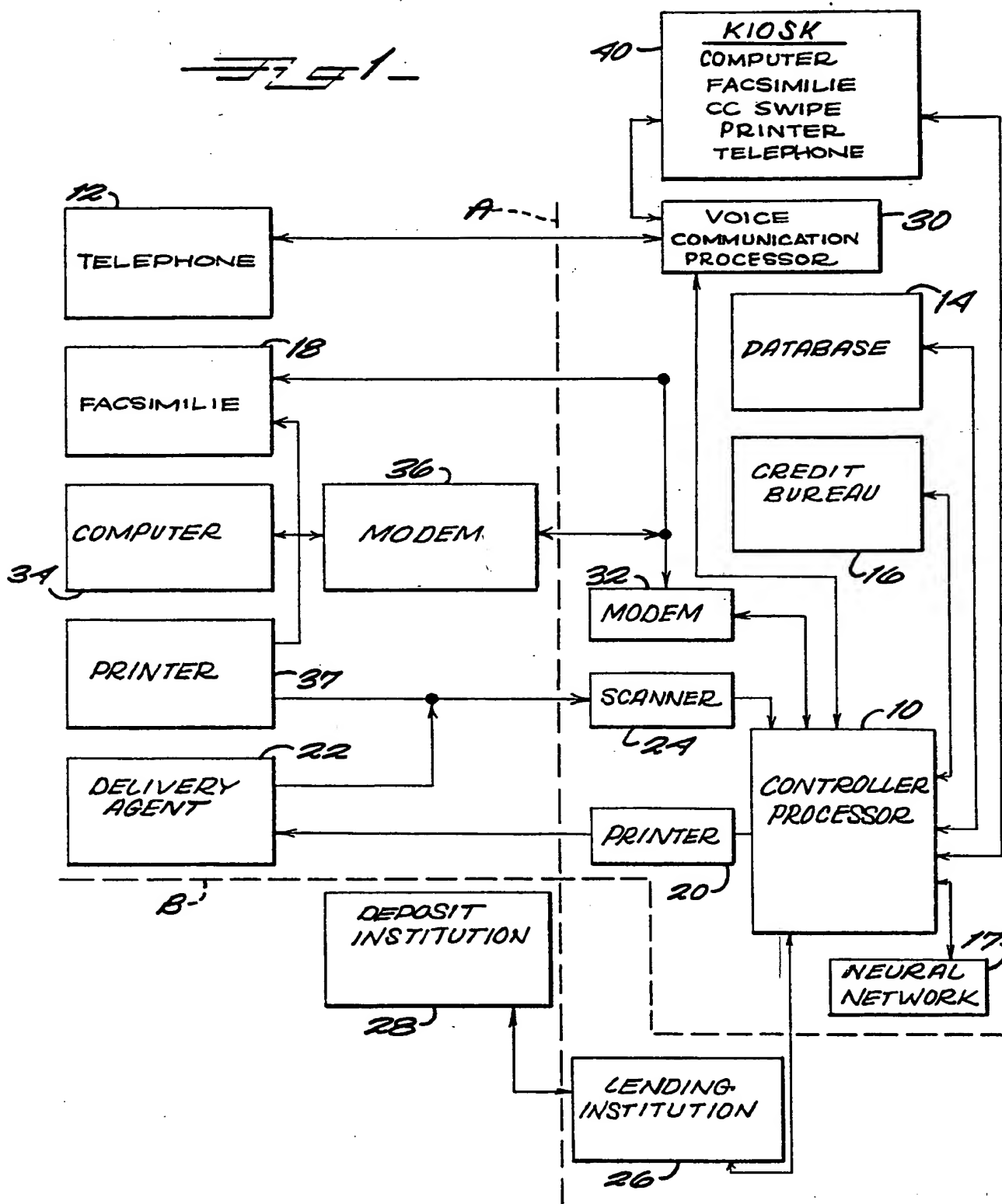


Fig 2

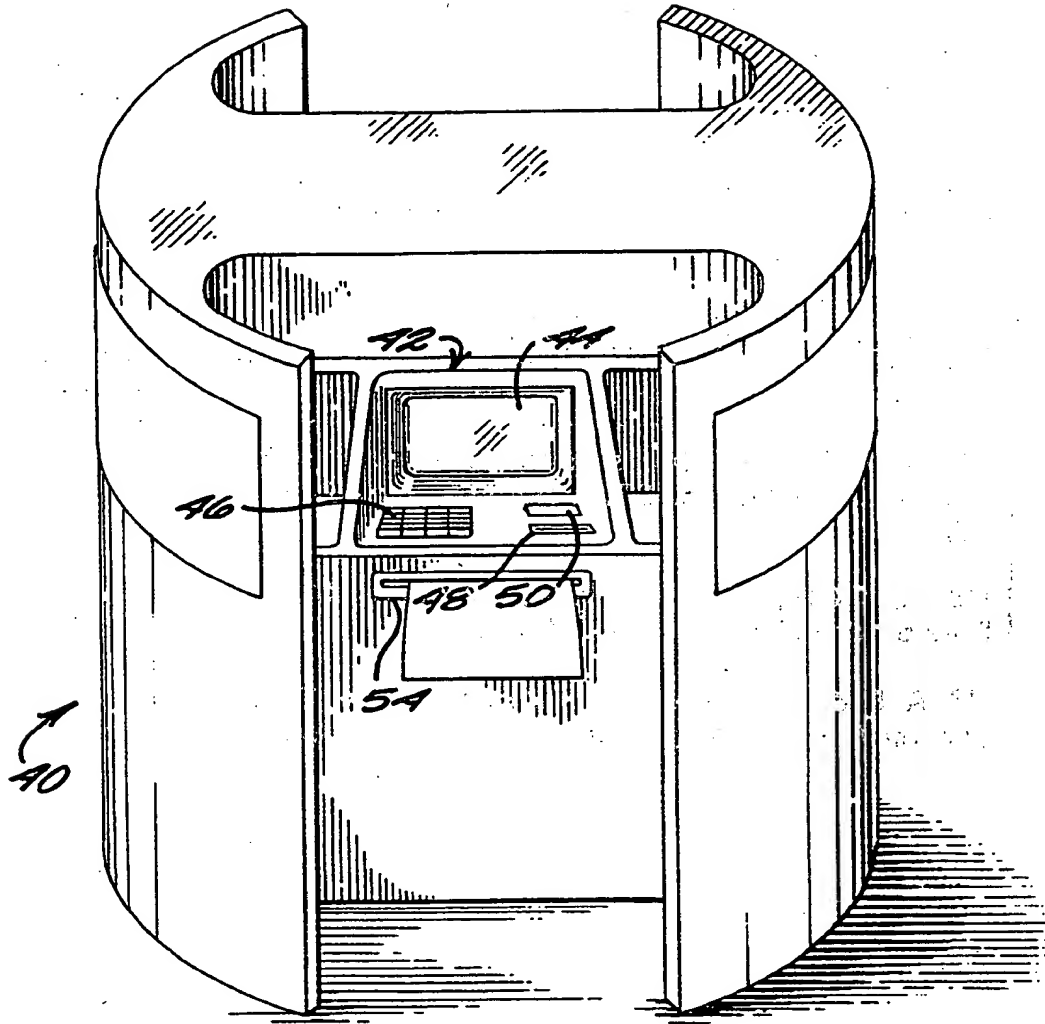
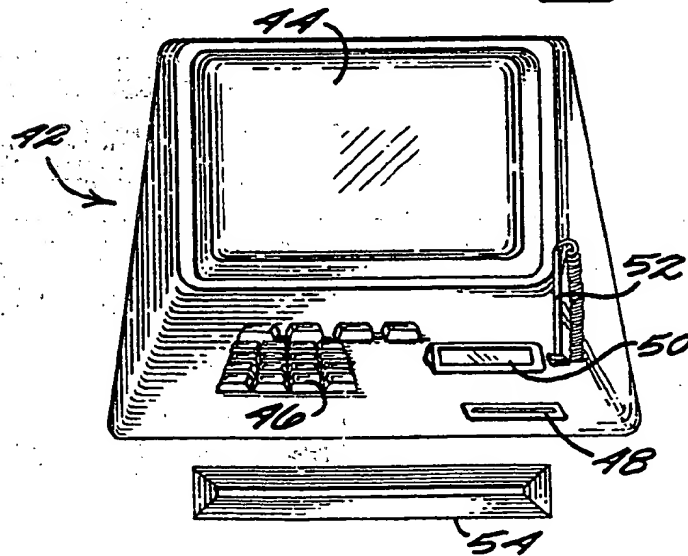


Fig 3



INTERNATIONAL SEARCH REPORT

International application No.
PCT/US94/09716

A. CLASSIFICATION OF SUBJECT MATTER

IPC(6) : G06F 17/50, 17/60

US CL : 364/408

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

U.S. : 364/408

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

DIALOG, Datastar

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US, A, 5,239,462 (Jones et al) 24 August 1993 column 2, line 47- column 4, line 33; column 5, line 47- column 7, line 45;	1-20
Y	US, A, 4,649,832 (Hain et al) 17 March 1987 column 1, lines 5-49; column 2, lines 36-54.	14, 16-20
Y, P	US, A, 5,241,620 (Ruggerio) 31 August 1993 See Figure 8; column 1, lines 5-27; column 9, line 60-column 10, line 64	5

☐ Further documents are listed in the continuation of Box C.☐ See patent family annex.

* Special categories of cited documents:

A document defining the general state of the art which is not considered to be part of particular relevance

E earlier document published on or after the international filing date

L document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

O document referring to an oral disclosure, use, exhibition or other means

P document published prior to the international filing date but later than the priority date claimed

T

later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

X

document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

Y

document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

Z

document member of the same patent family

Date of the actual completion of the international search

02 NOVEMBER 1994

Date of mailing of the international search report

12 JAN 1995

Name and mailing address of the ISA/US
Commissioner of Patents and Trademarks
Box PCT
Washington, D.C. 20231

Facsimile N (703) 305-9564

Authorized officer

Gail O. Hayes

Telephone No. (703) 305-9711

THIS PAGE BLANK (USPTO)

United States Patent [19]

Kimizu

[11] Patent Number: 5,053,606

[45] Date of Patent: Oct. 1, 1991

[54] CREDIT AUTHORIZATION TERMINAL WITH CIRCUITRY TO SERVICE PLURAL CUSTOMERS IN PARALLEL

[75] Inventor: Ryuichi Kimizu, Ootsu, Japan

[73] Assignee: Omron Tateisi Electronics Company, Kyoto, Japan

[21] Appl. No.: 202,667

[22] Filed: Jun. 6, 1988

[30] Foreign Application Priority Data

Jun. 8, 1987 [JP] Japan 62-142595

[51] Int. Cl.⁵ G06F 15/21; G06F 13/00

[52] U.S. Cl. 235/379; 235/380; 902/22; 902/39; 902/40

[58] Field of Search 364/408; 235/379, 380; 902/22, 24, 40, 39

[56] References Cited

U.S. PATENT DOCUMENTS

4,186,871	2/1980	Anderson et al.	235/380
4,417,137	11/1983	Lundblad	235/379
4,660,168	4/1987	Grant et al.	235/379 X
4,677,552	6/1987	Sibley, Jr.	902/39 X
4,683,536	7/1987	Yamamoto	364/408
4,698,746	10/1987	Goldstein	364/200
4,843,547	6/1989	Fuyama et al.	364/405

FOREIGN PATENT DOCUMENTS

0122344	10/1978	Japan
0143080	11/1981	Japan
0146372	8/1984	Japan
0157666	8/1985	Japan
0250759	12/1985	Japan
0080731	4/1987	Japan
2135493	8/1984	United Kingdom

Primary Examiner—Clark A. Jablon

Attorney, Agent, or Firm—Dickstein, Shapiro & Morin

[57] ABSTRACT

A credit authorization terminal (CAT), when communication processing is performed between the CAT and a host computer to perform settlement processing for one customer, performs input processing of information concerning settlement for the next customer in parallel with the communication processing. The CAT can continuously perform input processing of information concerning settlement for a plurality of customers. The CAT continues to perform communication processing to perform settlement processing for one customer without hanging up a line between the CAT and the host computer, when communication processing is terminated for the previous customer.

9 Claims, 8 Drawing Sheets

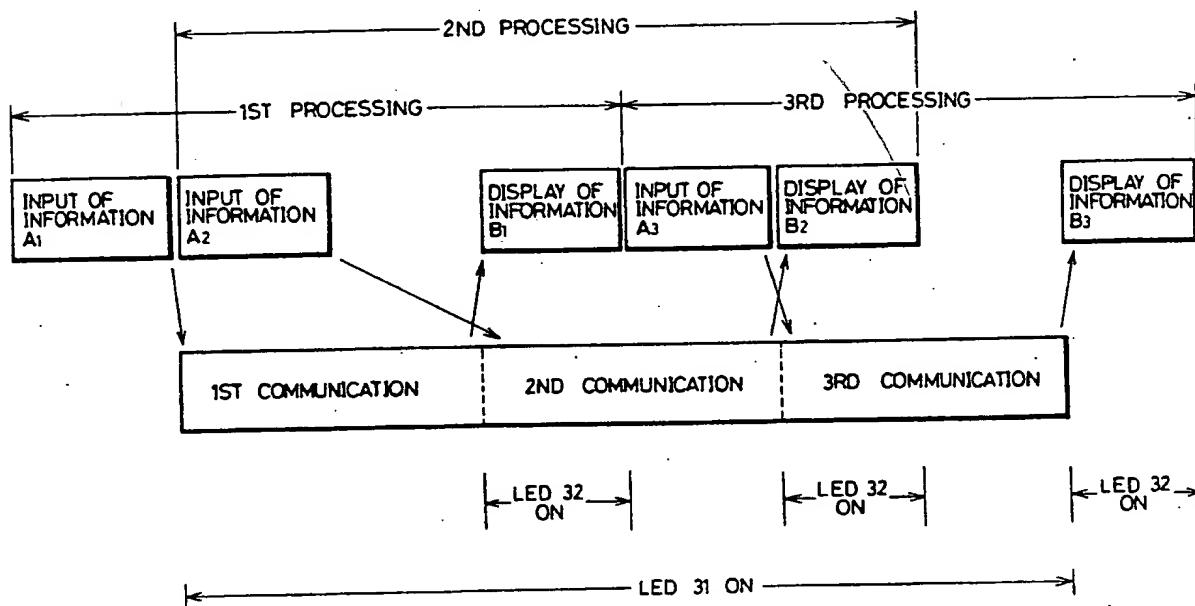


FIG.1 PRIOR ART

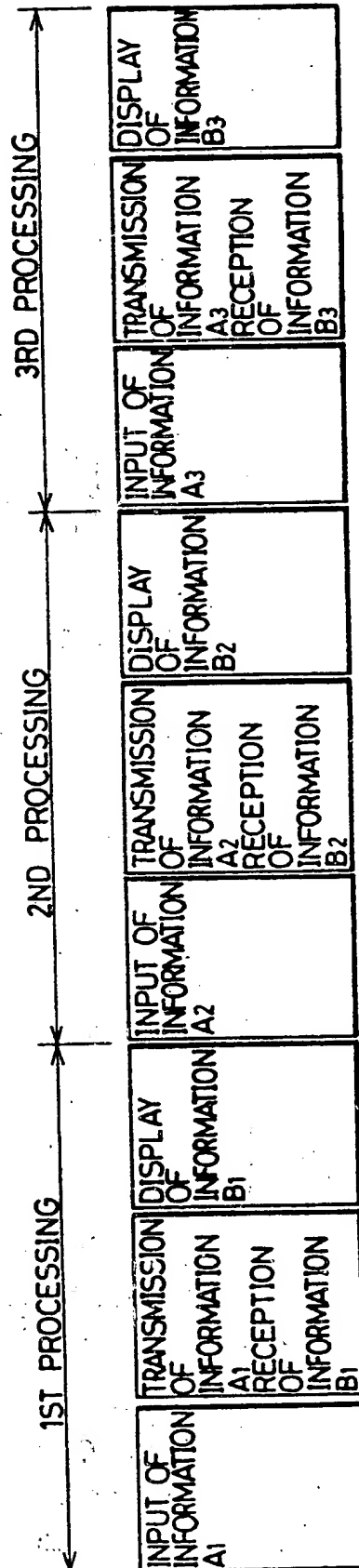


FIG. 2

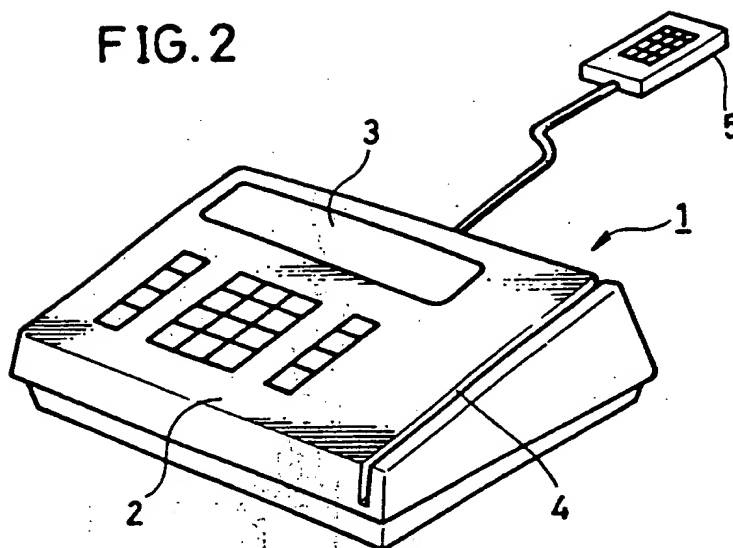


FIG. 3

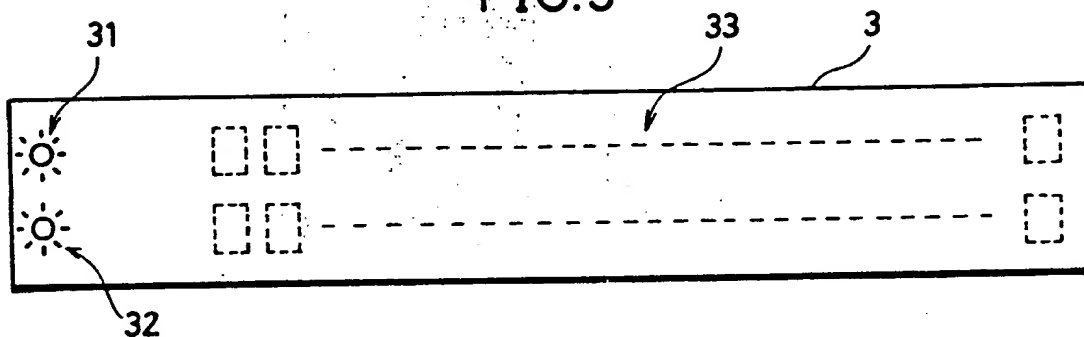


FIG. 4

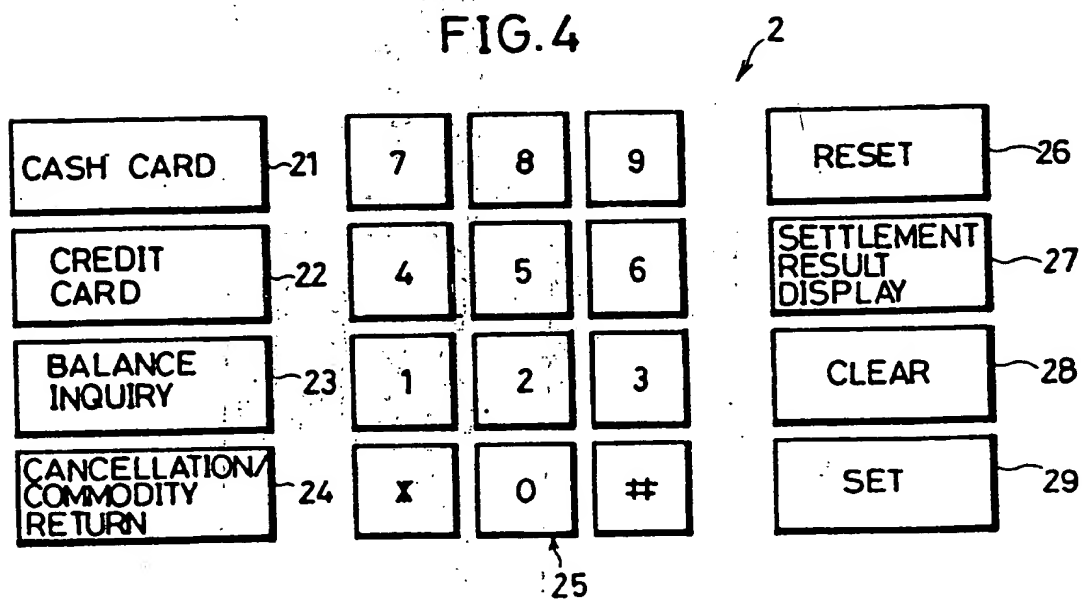


FIG. 5

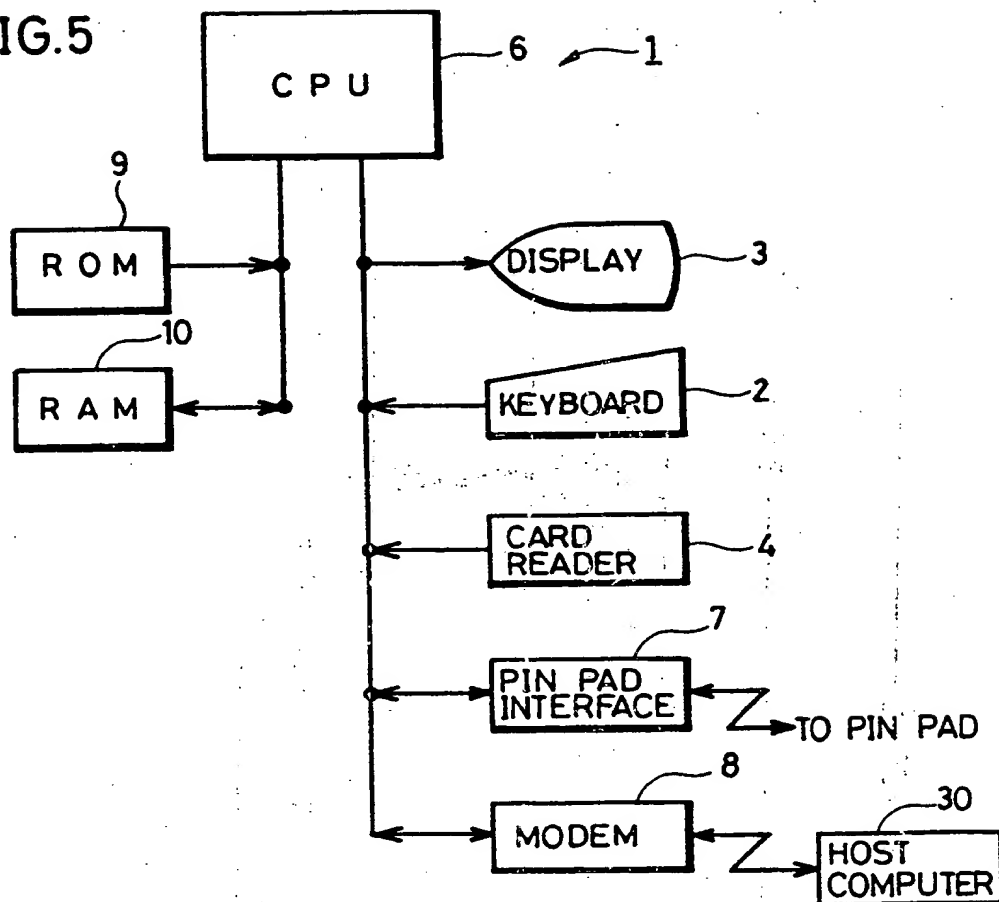


FIG. 6

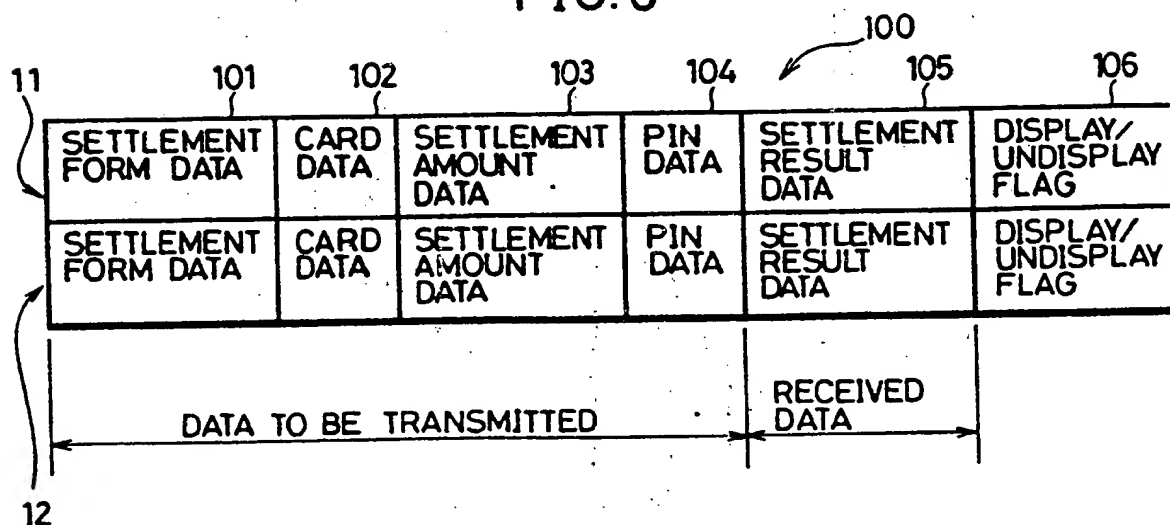


FIG. 7

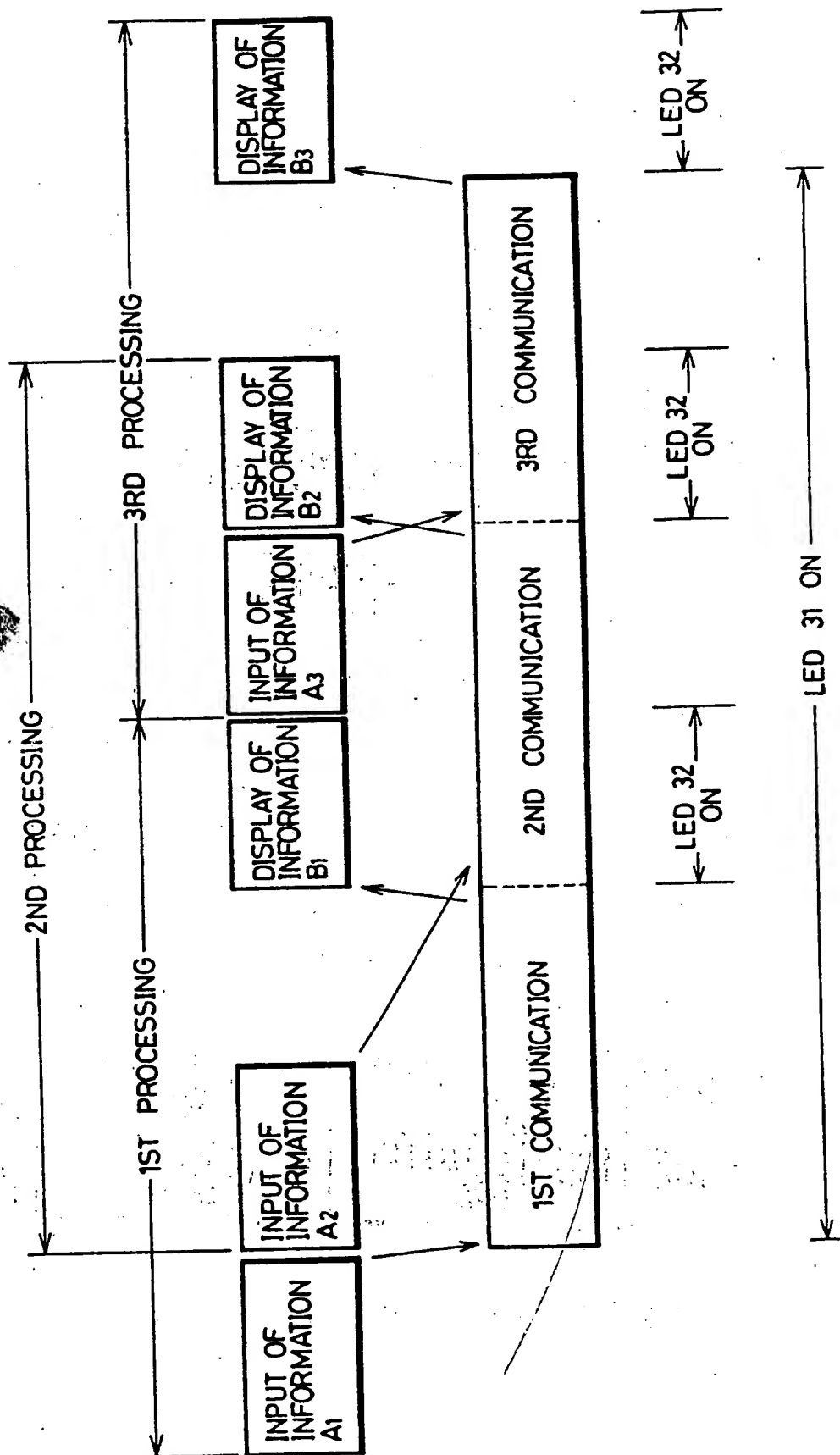


FIG.8A

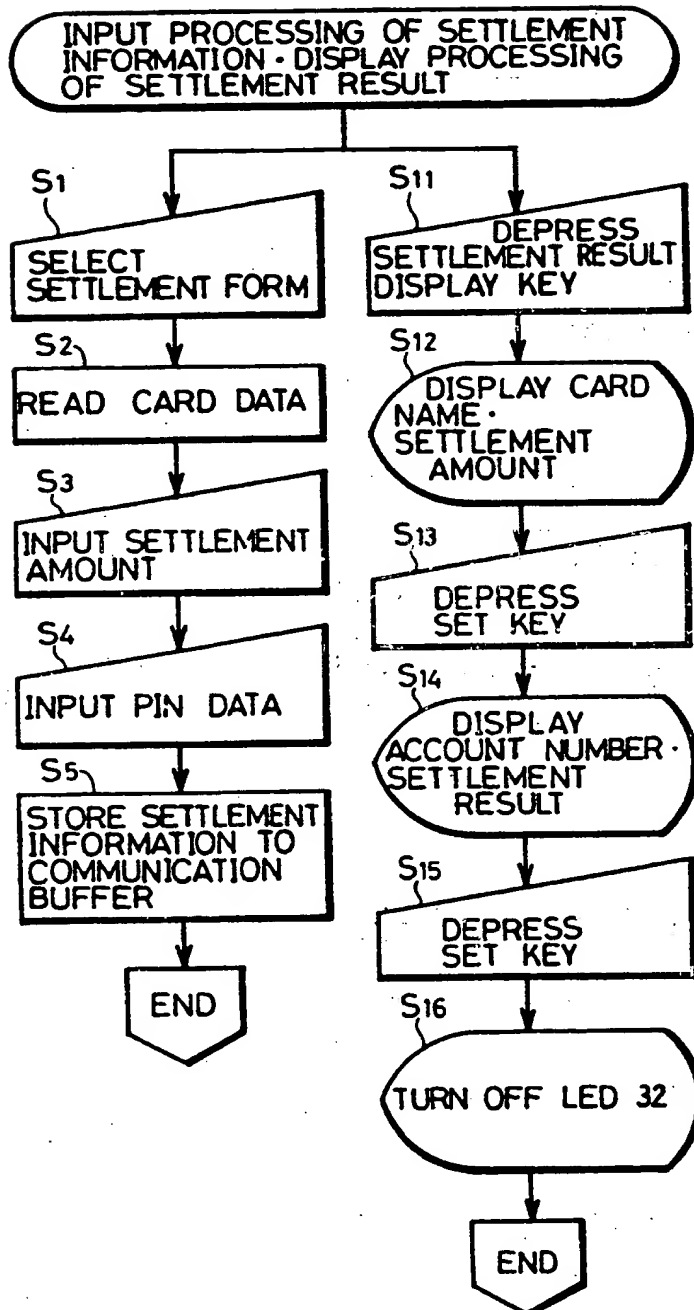


FIG.8B

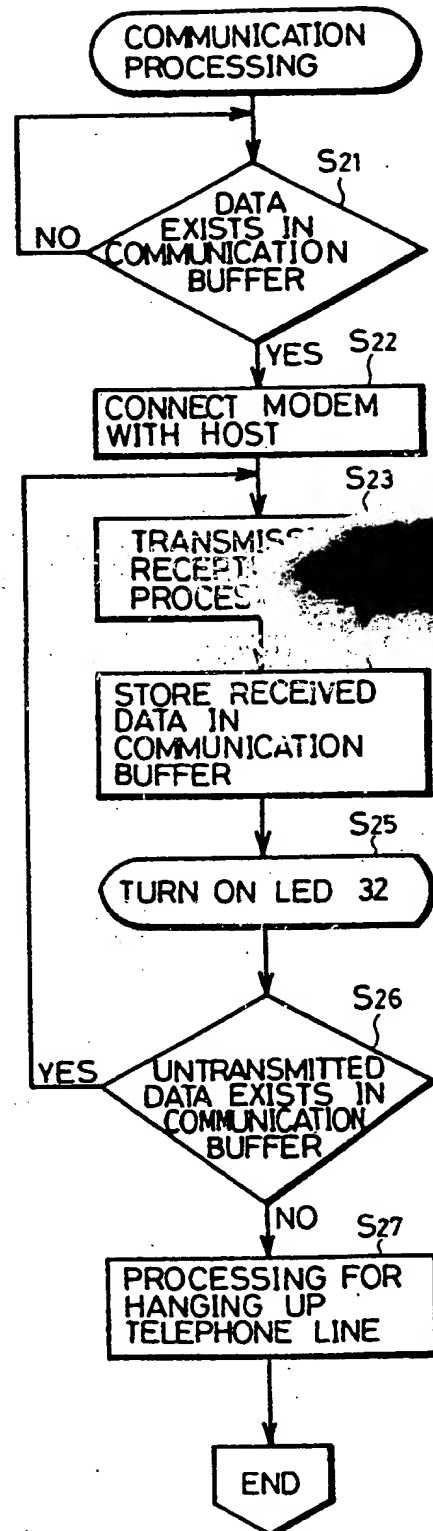


FIG. 9

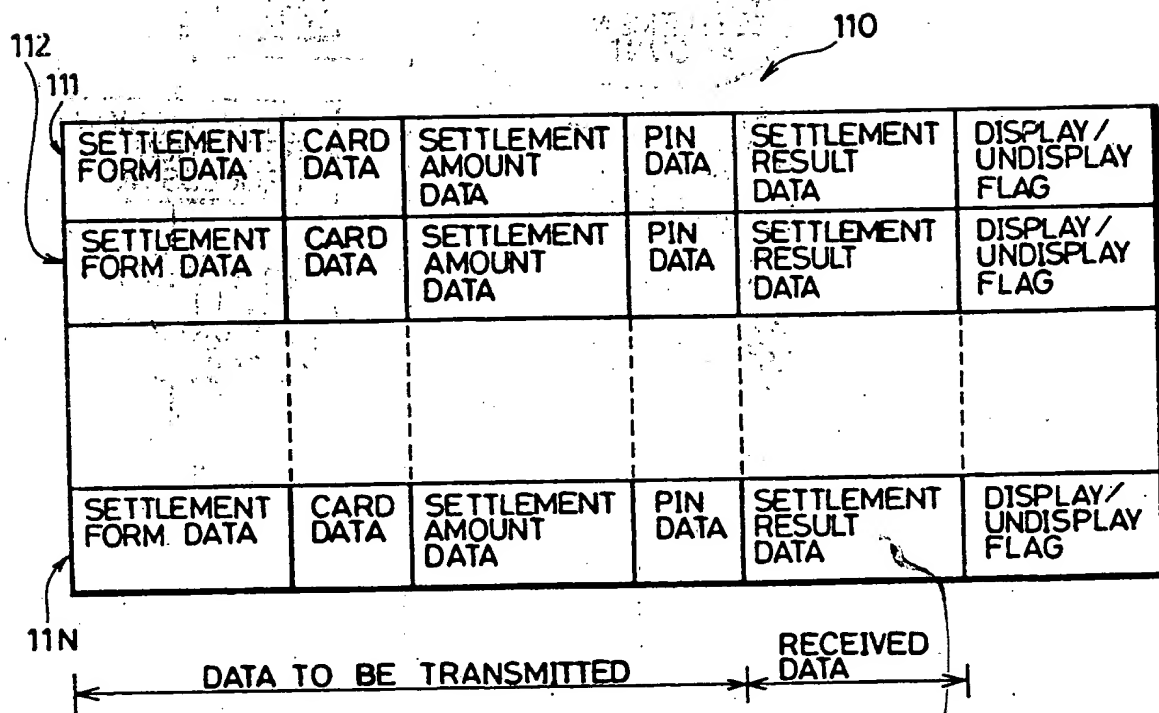


FIG. 10

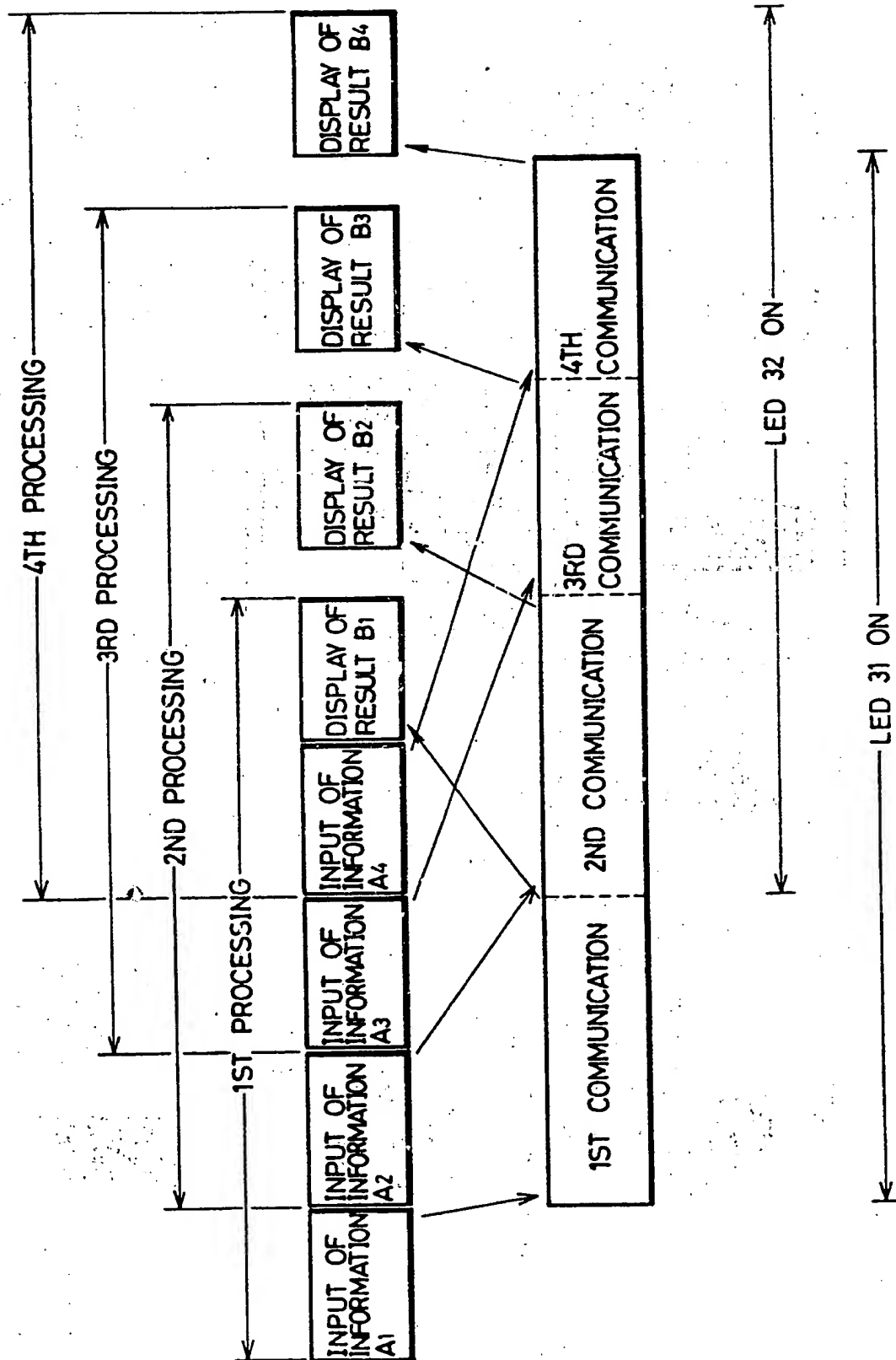


FIG.11A

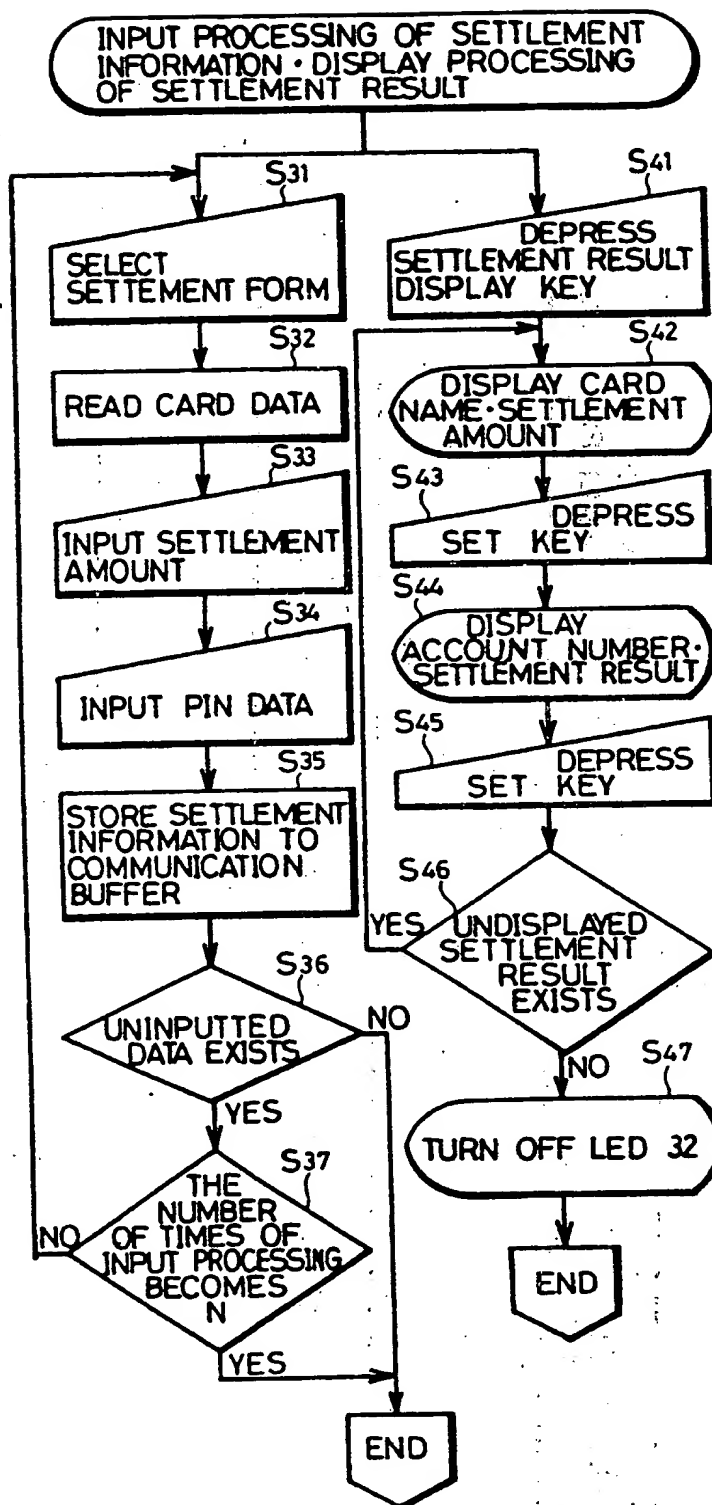
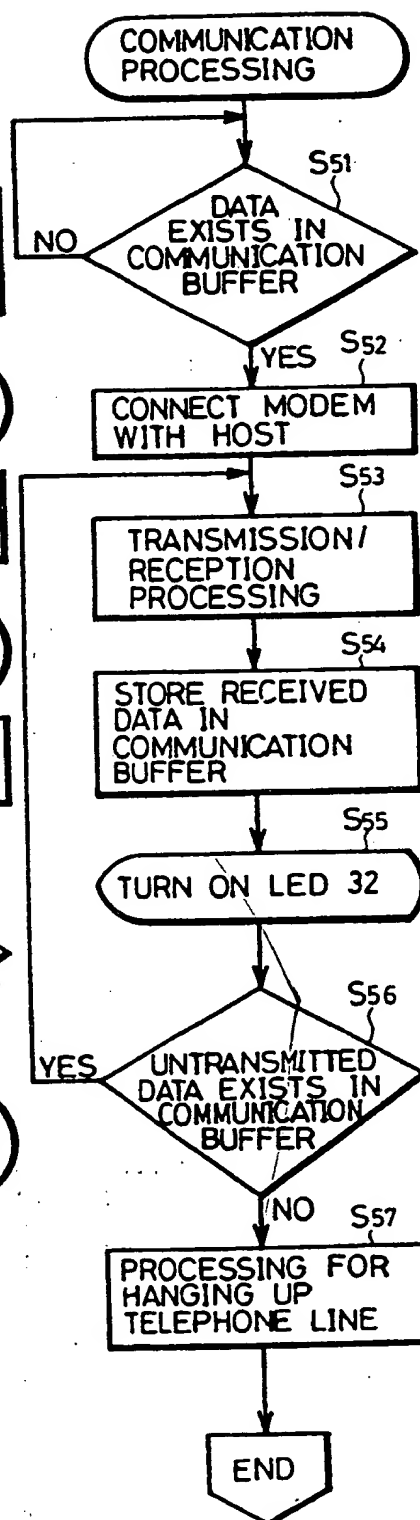


FIG.11B



CREDIT AUTHORIZATION TERMINAL WITH CIRCUITRY TO SERVICE PLURAL CUSTOMERS IN PARALLEL

BACKGROUND OF THE INVENTION

1. Field of the Invention

The present invention relates generally to a terminal, and more particularly, to a terminal which can be connected to a host for performing information processing through a communication line and perform in parallel processing for inputting information to be processed and processing for transmitting information to a host.

2. Description of the Prior Art

In recent years, as a credit card has been widely used, a card authorization terminal referred to as a CAT (Credit Authorization Terminal) is put into practice to automate settlement processing with the credit card, or the like. The CAT has a communication function and can be connected to a host computer of a card company through a telephone line. The conventional CAT is provided with a card reader, a keyboard, a display, a printer and the like, to which a PIN pad is connected. The card reader is used for reading card data from the credit card. The keyboard is used for inputting a settlement amount of a customer. The display is used for displaying a guidance message for operation or the result of settlement. The printer is used for printing information concerning settlement. The PIN pad is used for customer's inputting his or her personal identity number.

FIG. 1 is a timing chart of settlement processing performed by the conventional CAT. FIG. 1 shows a case in which settlement processing is performed for three customers. First, information a1 to be settled for one customer is inputted and stored, which information comprises card data, settlement amount data and personal identity number data. Then, a telephone number of the host computer is dialed, so that the host computer is called. Consequently, the information a1 is transmitted to the host computer. The host computer performs settlement processing based on the transmitted information a1, to obtain information b1 indicating the result of settlement. The obtained information b1 is transmitted to the CAT. The transmitted information b1 indicating the result of settlement is displayed on the display in the CAT. Consequently, settlement processing for one customer is terminated, whereby settlement information of the next customer can be inputted. The same processing as described above is performed for the next customer.

In the conventional CAT, as described above, the settlement information of one customer can not be inputted until the settlement processing for the previous customer is terminated, and thirty seconds or more are required for communication processing between the CAT and the host computer. Thus, one customer must wait for a long time until settlement processing for the previous customer is terminated.

SUMMARY OF THE INVENTION

An object of the present invention is to provide a terminal for performing information processing without any waiting time.

Another object of the present invention is to provide a terminal which can reduce the cost required for communication.

Still another object of the present invention is to provide a terminal for performing settlement processing without making a customer wait.

Briefly stated, the present invention is directed to a terminal including inputting means for inputting information to be processed, transmitting means for transmitting to a host the information inputted from the inputting means, and control means for allowing processing for inputting information by the inputting means in parallel with transmission processing of the transmitting means.

In accordance with another aspect of the present invention, the control means allows processing for inputting continuously a plurality of information by the inputting means in parallel with the transmission processing of the transmitting means.

In accordance with still another aspect of the present invention, the control means allows processing for transmitting one information by the transmitting means without hanging up a line between the terminal and the host when transmission of the previous information is terminated.

In accordance with still another aspect of the present invention, the transmitting means receives from the host the result of information processing performed by the host. In addition, the terminal includes outputting means for outputting the result of information processing. The control means allows the input processing of the inputting means and the output processing of the outputting means in parallel with transmission/reception processing of the transmitting means.

In accordance with still another aspect of the present invention, the terminal comprises inputting means for inputting information concerning settlement for each customer, transmitting means for transmitting to the host the information concerning settlement inputted from the inputting means, and control means allowing the input processing of the inputting means in parallel with the transmission processing of the transmitting means.

In accordance with still another aspect of the present invention, the transmitting means receives from the host information indicating the result of settlement. In addition, the terminal includes display means for displaying the information indicating the result of settlement received by the transmitting means. In parallel with transmission processing of the transmitting means to perform settlement processing for one customer, the control means allows processing for displaying on the display means information indicating the result of settlement for the previous customer. In accordance with still another aspect of the present invention, the terminal includes informing means for informing that there is information indicating the result of settlement which has not been displayed on the display means, and display commanding means for issuing a display command to the display means. The control means allows processing for displaying on the display means the information indicating the result of settlement in response to the command of the display commanding means.

In accordance with still another aspect of the present invention, the terminal includes storing means for storing the information concerning settlement inputted from the inputting means for each customer. The control means allows the input processing of the inputting means until a storage area of the information concerning settlement becomes full in the storing means, in

parallel with the transmission processing of the transmitting means.

In accordance with still another aspect of the present invention, the control means allows processing for transmitting the information concerning settlement by the transmitting means without hanging up the line between the terminal and the host if information concerning settlement which has not been transmitted is stored in the storing means.

According to the present invention, input processing of information to be processed can be performed in parallel with transmission processing between the terminal and the host, and processing for inputting continuously a plurality of information to be processed can be performed, so that information processing can be performed without any waiting time. When transmission of information is terminated, information to be next processed can be continuously transmitted without hanging up the line between the terminal and the host, so that communication efficiency is improved and communication cost can be reduced.

The terminal according to the present invention allows the input processing of the information concerning settlement in parallel with the transmission processing and can quickly permit display processing of the information indicating the result of settlement when it is received from the host, so that a customer does not made to wait for a long time. Thus, the terminal according to the present invention contributes to the improvement of service to customers as well as the improvement of the image of shops.

These objects and other objects, features, aspects and advantages of the present invention will become more apparent from the following detailed description of the present invention when taken in conjunction with the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a timing chart showing an operation of a conventional CAT;

FIG. 2 is a perspective view showing the appearance of a CAT which are common to first and second embodiments of the present invention;

FIG. 3 is a diagram showing a display in the CAT shown in FIG. 2;

FIG. 4 is a key arrangement of the CAT shown in FIG. 2;

FIG. 5 is a schematic block diagram showing electrical structure of the CAT shown in FIG. 2;

FIG. 6 is illustration showing a storage area in a RAM according to a first embodiment;

FIG. 7 is a timing chart according to the first embodiment;

FIGS. 8A and 8B are flow charts for explaining an operation of the first embodiment;

FIG. 9 is illustration showing a storage area in a RAM according to the second embodiment;

FIG. 10 is a timing chart according to the second embodiment; and

FIGS. 11A and 11B are flow charts for explaining an operation according to the second embodiment.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

The present invention can be applied to any terminal which can be connected to a host through a communication line. Description is now made on a settlement processing terminal as preferred embodiments.

First Embodiment

FIG. 2 is a perspective view showing the appearance of a CAT according to an embodiment of the present invention, FIG. 3 is a diagram showing a display shown in FIG. 2, FIG. 4 is a diagram showing a key arrangement of a keyboard shown in FIG. 2, and FIG. 5 is a schematic block diagram showing electrical structure of the CAT shown in FIG. 2. Referring now to FIGS. 2 to 5, the structure of the CAT according to an embodiment of the present invention will be described.

As shown in FIG. 2, the main body of a CAT 1 is provided with a keyboard 2, a display 3, and a card reader 4, to which a PIN pad 5 is connected. As shown in FIG. 3, the display 3 is provided with an LED 31, and an LED 32 and a character display portion 33. The LED 31 is used for indicating that data transmission is made between the CAT 1 and a host computer 30, which is turned on for lighting during communication. The LED 32 is used for indicating that there exists information indicating the result of settlement which has not been displayed yet in the character display portion 33, which is turned on for lighting when there exists undisplayed information. The character display portion 33 is used for displaying a guidance message for operation, information concerning settlement to be settled and information indicating the result of settlement.

As shown in FIG. 4, the keyboard is provided with a cash card key 21, a credit card key 22, a balance inquiry key 23, a cancellation/commodity return key 24, a ten-key 25, a reset key 26, a settlement result display key 27, a clear key 28 and a set key 29. The cash card key 21 is used for commanding settlement processing with a cash card. The credit card key 22 is used for commanding settlement processing with a credit card. The balance inquiry key 23 is used for commanding an inquiry about the balance. The cancellation/commodity return key 24 is used for commanding the cancellation of a credit transaction and return commodities. The ten-key array 25 is used for inputting settlement amount data or the like. The reset key 26 is used for commanding a reset operation. The settlement result display key 27 is used for commanding a display on the display 3 of information indicating the result of settlement. The clear key 28 is used for commanding a clear memory. The set key 29 is used for commanding a in the content displayed on the display 3. The card reader 4 is used for reading card data from the cash card or the credit card. The PIN pad 5 is used for customer's inputting his or her personal identity number.

As shown in FIG. 5, the CAT 1 is provided with a CPU 6. The CPU 6 is connected to a PIN pad interface 7, an MODEM 8, a ROM 9 and a RAM 10, in addition to the above described keyboard 2, the display 3 and the card reader 4. The PIN pad interface 7 is used for making data transmission between the CPU 6 and a PIN pad 5, to which the PIN pad 5 is connected. The MODEM 8 is used for making data transmission between the CPU 6 and the host computer 30. An operation program of the CPU 6 is stored in the ROM 9. Information concerning settlement and information indicating the result of settlement are stored in the RAM 10.

FIG. 6 shows a storage area in the RAM 10. In FIG. 6, the storage area 100 is provided with communication buffers 11 and 12 in order to store information concerning settlement for two customers. The communication buffers 11 and 12 are provided with areas 101 to 106. Settlement form data indicating whether settlement is

performed with a cash card or a credit card is stored in the area 101. Card data read from the cash card or the credit card is stored in the area 102. Settlement amount data is stored in the area 103. PIN data (personal identity number data) is stored in the area 104. Settlement result data is stored in the area 105. A display/undisplay flag is stored in the area 106. The display/undisplay flag is used for indicating whether or not settlement result data is displayed on the display 3. The data stored in the areas 101 to 104 are data to be transmitted to the host computer 30 to perform settlement processing. The settlement result data stored in the area 105 is data transmitted from the host computer 30.

FIG. 7 is a timing chart according to an embodiment of the present invention.

FIGS. 8A and 8B are flow charts for explaining an operation according to an embodiment of the present invention, where FIG. 8A shows input processing of information concerning settlement and display processing of information indicating the result of settlement, and FIG. 8B shows communication processing.

Referring now to FIGS. 2 to 8B, the operation according to an embodiment of the present invention will be described. In the present embodiment, the CPU 6 performs multitask processing based on a program stored in the ROM 9, so that the input processing of information concerning settlement, the communication processing and the display processing of the result of settlement are performed in parallel.

When an operator performs continuously settlement processing for a plurality of customers, the operator first inputs information concerning settlement for the first customer. More specifically, the operator first designates the form of settlement, i.e., immediate settlement processing with the cash card, credit processing with the credit card or the like (in the step S 1). The designation is achieved by operating the cash card key 21 or the credit card key 22. Then, the operator inserts a card into the card reader 4. The card reader 4 reads card data from the inserted card (in the step S 2). Then, the operator operates the ten-key array 25 to input a settlement amount (in the step S 3). Then, a customer operates the PIN pad 5 to input the PIN data (in the step S 4). The CPU 6 stores the inputted information concerning settlement in the communication buffer 11 in the RAM 10 (in the step S 5). The above described input processing corresponds to input processing of information a1 in first processing shown in FIG. 7.

The CPU 6 determines whether or not information concerning settlement is stored in the communication buffer 11 (in the step S 21). When the information concerning settlement is stored, the CPU 6 connects the MODEM 8 with the host computer 30 through a telephone line by dialing (in the step S22). The CPU 6 then reads the information concerning settlement from the communication buffer 11, to transmit the same to the host computer 30 (in the step S 23). The host computer 30 performs settlement processing based on the transmitted information concerning settlement. The host computer 30 debits a customer's account for the amount to be settled when the cash card is used while registering the amount to be settled on a file when the credit card is used. The host computer 30 may be employed both for the cash card and the credit card. Alternately, the host computer 30 for the cash card and the host computer 30 for the credit card may be separately provided. The host computer 30 transmits to the CAT 1 the obtained information b1 indicating the result of settle-

ment. The CPU 6 in the CAT 1 is responsive to the reception of the information b1 for indicating the result of settlement for storing the information b1 in the communication buffer 11 (in the step S 24). Then, the CPU 6 turns the LED 32 on for lighting in order to indicate that information indicating the result of settlement which has not been displayed yet is stored in the communication buffer 11 (in the step S 25), as well as sets the undisplay flag in the area 106 in the communication buffer 11. The above described communication processing corresponds to first communication processing in the first processing shown in FIG. 7. The CPU 6 determines whether or not information concerning settlement which has not been transmitted to the host computer 30 exists in the communication buffers 11 and 12 (in the step S 26). In general, when unprocessed data exists, communication processing of the data is performed (in the steps S 23 to 25). On the other hand, when unprocessed data does not exist, processing for hanging up a telephone line is performed (in the step S 27). In this case, since the information concerning settlement is stored in the communication buffer 12 during the first communication processing as described below, the program proceeds from the step S 26 to the step S 23.

Since the CAT 1 has a multitask function, the operator which finished inputting the information concerning settlement for the first customer can input information concerning settlement for the next customer during the communication processing for the first customer. The input processing for the second customer corresponds to input processing of information a2 in second processing shown in FIG. 7. Since data has already been stored in the communication buffer 11, the inputted information concerning settlement is stored in the communication buffer 12. When inputting of the information concerning settlement for the second customer is terminated, the operator waits until the communication processing for the first customer is terminated, confirms that the LED 32 in the display 3 is turned on for lighting, and commands to display the result of settlement (in the step S 11). This command is achieved by operating the settlement result display key 27. The CPU 6 is responsive to the operation of the settlement result display key 27 for reading out data from the communication buffer 11 having the undisplay flag set therein to display the same on the display 3. The CPU 6 allows display a card company name data included in the card data and a settlement amount as the first display data (in the step S 12), and allows displaying an account number included in the card data and the result of settlement in response to the operation of the set key 29 (in the steps S 13 to S 14). Then, the CPU 6 is responsive to the operation of the set key 29 for turning off the LED 32 (in the steps S 15 to S 16), to set the display flag in the area 106 in the communication buffer 11. The display processing of the result of settlement corresponds to display processing of the information b1 indicating the result of settlement in the first processing shown in FIG. 7. Data in the buffer area having the display flag set therein is replaced by information concerning settlement for the next customer when it is inputted.

Since the information concerning settlement for the second customer is inputted during the communication processing for the first customer, second communication processing for the second customer is performed without hanging up the line after the first communication processing for the first customer is terminated, as

shown in FIG. 7. In addition, when the second communication processing for the second customer is performed, information concerning settlement for a third customer is inputted, so that third communication processing for the third customer is performed subsequently to the second communication processing for the second customer.

Meanwhile, the CPU 6 turns the LED 31 on for lighting during the time period from the time when the line between the CAT 1 and the host computer 30 is connected to the time when the line is hung up.

Second Embodiment

Structure of a CAT according to a second embodiment is the same as that according to the first embodiment shown in FIGS. 2 to 5.

FIG. 9 shows a storage area in a RAM 10. As shown in FIG. 9, according to the present embodiment, a storage area 110 is provided with N communication buffers 111 to 11N. Settlement form data, card data, settlement amount data, PIN data, settlement result data and display/undisplay flag are stored in the communication buffers, respectively, as in the communication buffers shown in FIG. 6.

FIG. 10 is a timing chart according to the present embodiment. FIGS. 11A to 11B are flow charts for explaining an operation according to the present embodiment, where FIG. 11A shows input processing of information concerning settlement and display processing of the result of settlement, and FIG. 11B shows communication processing. Referring now to FIGS. 2 to 5 and FIGS. 9 to 11B, the operation according to the present embodiment will be described. In the same manner as described in the first embodiment, input processing of information concerning settlement is performed for a first customer (in the steps S 31 to S 34). The inputted information concerning settlement is stored in the communication buffer 111 (in the step S 35). An operator determines whether or not there exists information concerning settlement which has not been inputted yet (in the step S 36). When there exists information concerning settlement which has not been inputted yet, the information concerning settlement is inputted subsequently to the input processing for the first customer. The number of times of input processing of the information concerning settlement is restricted by the number of communication buffers. The CPU 6 determines whether or not the number of times of input processing of the information concerning settlement is N (in the step S 37). When the number of times of input processing becomes N, the communication buffer becomes full, so that an input operation is terminated.

According to the present embodiment, input processing is continuously performed for, for example, four customers. The input processing corresponds to input processing of information a1 in first processing, input processing of information a2 in second processing, input processing of information a3 in third processing and input processing of information a4 in fourth processing shown in FIG. 10. The CPU 6 determines whether or not information concerning settlement is stored in any of the communication buffers (in the step S 51). When the information concerning settlement is stored, communication processing is performed in the same manner as described in the first embodiment (in the steps S 53 to S 57). The communication processing corresponds to first communication processing, second communication processing, third communication processing and fourth

communication processing shown in FIG. 10. The CPU 6 turns the LED 32 on for lighting when first communication processing is terminated.

The operator operates the settlement result display key 27 to display the result of settlement on the display 3 when the input processing is terminated for, for example, four customers (in the step S 41). The CPU 6 reads out information concerning settlement and information indicating the result of settlement from the communication buffer 110, to display the same on the display 3, in the same manner as described in the first embodiment (in the steps S 42 to S 45). According to the present embodiment, the CPU 6 determines whether or not there exists information indicating the result of settlement which has not been displayed yet every time the CPU 6 displays data from one communication buffer (in the step S 46), and turns the LED 32 off when display processing of all information indicating the result of settlement is terminated (in the step S 47). It is determined based on the display/undisplay flag stored in each of the communication buffers whether or not there exists information indicating the result of settlement which has not been displayed yet. The display processing of the information indicating the result of settlement corresponds to display processing of the result b1 of settlement, display processing of the result b2 of settlement, display processing of the result b3 of settlement and display processing of the result b4 of settlement shown in FIG. 10.

Meanwhile, the CPU 6 turns the LED 31 on for lighting while communication processing is performed.

According to the present embodiment, input processing of information concerning settlement can be continuously performed for a plurality of customers during communication between the CAT 1 and the host computer 30.

Although the present invention has been described and illustrated in detail, it is clearly understood that the same is by way of illustration and example only and is not to be taken by way of limitation, the spirit and scope of the present invention being limited only by the terms of the appended claims.

What is claimed is:

1. A single data processing terminal for connecting to a host for performing settlement processing through a communication line, comprising:

inputting means for entering data into the single data processing terminal, the inputting means being operative to sequentially input settlement information relating to at least a first customer and a second customer,

storing means, connected to the inputting means, having a storage area for storing settlement information for each of the first customer and the second customer inputted from said inputting means, transmitting means, connected to the storing means, for transmitting the settlement information to the host; and

control means, connected to the inputting means, the storing means and the transmitting means, and operative to cause information input processing of the settlement information relating to either one of the first customer and the second customer by the inputting means until the storage area in the storing means becomes full, and to cause transmission processing of the settlement information relating to the other of either one of the first customer or the

second customer to be sent in parallel at the same time by the transmitting means to the host.

2. A single data processing terminal according to claim 1, wherein the control means further comprises means for transmitting the settlement information by way of the transmitting means without disconnecting a phone line between the terminal and the host if the storing means contains settlement information that has not been transmitted to the host.

3. A single data processing terminal for connection to a host for performing information processing through a communication line, comprising:

inputting means for entering data into the single data processing terminal, the inputting means being operative to sequentially input information to be processed relating to at least a first customer and a second customer,

transmitting means, connected to said inputting means, for transmitting to the host the information that is sequentially input from the inputting means, and

control means connected to the inputting means and the transmitting means, and operative to cause input processing of the information relating to either one of the first customer or the second customer by the inputting means in parallel with causing transmission processing in which input information relating to the other one of the first customer or the second customer by is transmitted by the transmitting means to the host.

4. A single data processing terminal according to claim 3, wherein the inputting means is operative to further sequentially input information relating to at least a third customer, and said control means is operative to cause the inputting means to perform input processing of the information relating to two of the first customer, the second customer and the third customer in parallel with transmission processing in which input information relating to the remaining one of the first customer, the second customer or third customer is transmitted by the transmitting means to the host.

5. A single data processing terminal according to claim 3, wherein the control means causes transmission processing of information subsequently input by one of the customers by having the transmitting means transmit the information without disconnecting a phone line between the terminal and the host when terminating the transmitting of prior input information for another one of the customers using the transmitting means.

6. A single data processing terminal for connection to a host for performing information processing through a communication line, comprising:

inputting means for entering data into the single data processing terminal, the inputting means being operative to sequentially input information to be processed,

transmitting means, connected to the inputting means, for transmitting the information inputted from the inputting means to the host and for receiv-

ing a result of information processing based on the transmitted information from the host, outputting means for outputting the result of information processing received by the transmitting means from the host, and

control means, connected to the inputting means, the transmitting means and the outputting means, and operative to cause information input processing of the information input by the inputting means and output processing of the result of information processing output by the outputting means in parallel with transmission processing of the information inputted by the inputting means to the transmitting means and reception processing of the result of information processing received from the host.

7. A single data processing terminal for connection to a host for performing settlement processing through a communication line, comprising:

inputting means for entering data into the single data processing terminal, the inputting means being operative to sequentially input settlement information relating to at least a first customer and a second customer,

transmitting means, connected to the inputting means, for transmitting the settlement information to the host, and

control means, connected to the inputting means and the transmitting means, and operative to cause information input processing of the settlement information relating to either one of the first customer and the second customer in parallel with transmission processing in which input information relating to the other of the first customer or the second customer is transmitted by the transmitting means to the host.

8. A single data processing terminal according to claim 7, wherein the transmitting means receives information indicating the result of settlement from the host; the single data processing terminal further comprising a display means for displaying the settlement information received by the transmitting means; and wherein, in parallel with the transmission processing of the transmitting means to perform settlement processing for either one of the first or second customer, the control means displays on the display means the settlement information of a previous customer.

9. A single data processing terminal according to claim 7, which further comprises,

informing means, connected to said control means, for informing that there exists settlement information which has not been displayed on the display means, and

display commanding means for issuing a display command to the display means,

the control means further comprising means for displaying on the display means settlement information in response to the display command.

* * * * *